



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/583,051

06/14/2006

Peng Zhang

42P22776

8821

8791

7590

04/20/2010

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER

CORUM, WILLIAM ALLEN

ART UNIT

PAPER NUMBER

2433

MAIL DATE

DELIVERY MODE

04/20/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/583,051	Applicant(s) ZHANG, PENG	
	Examiner WILLIAM CORUM	Art Unit 2433	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 June 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/21/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 12 - 14, are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 12 – 14 claim a “storage medium comprising software” ” however the claims do not clearly define a storage medium to be a memory/disk, see Applicant’s specification para. 14, lines 5-9, (storage medium can be a programmable electronic circuit or any kind of interconnect) and thus “storage medium” is considered in the broadest reasonable interpretation of the claim covers forms of non-transitory tangible media and transitory propagating signals per se in view of the ordinary and customary meaning of computer readable media.

3. The Examiner suggests Applicant to review the recent memorandum entitled “Subject matter Eligibility of Computer readable media” issued on January 16, 2010 from the Under Secretary of Commerce for Intellectual Property and Director of the United State Patent and Trademark Office , David J. Kappos (http://www.uspto.gov/patents/law/notices/101_crm_20100127.pdf) and amend the claim to include either limitation “non-transitory” or the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc... .

Claim Objections

4. Claim 11 is objected to because of the following informalities: The word 'method' should be replaced by the word 'system'. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 7-8, 11-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Swimmer et al. (US Pub. 20040255163 A1).

7. Regarding claim 1, Swimmer discloses a method comprising: receiving in a virtual machine contents of a program for creating a virtual environment for interacting with a host platform in a computing device (**para. 17, 22, 44-45; With the intrusion detection system performing the function of a virtual machine, a daemon is analogous to a program creating a virtual environment and the operating system being analogous to the host platform**); and determining by the virtual machine if the received contents comprises predetermined instructions for performing at least one unauthorized task. (**para. 22-23- malicious code strings being analogous to predetermined instructions for performing unauthorized tasks**)

8. Regarding claim 2, Swimmer discloses the method of claim 1, wherein the determining if the received contents comprises predetermined instructions further

Art Unit: 2433

comprises: comparing the received contents of the program to at least one predetermined instruction patterns corresponding to the predetermined instructions for performing the at least one unauthorized task **(para. 22, a pattern filter is used to identify malicious code strings)**; and purging the predetermined instructions from the received contents based on the comparing. **(para. 15, 17- the malicious code string is extracted from the daemon code)**

9. Regarding claim 3, Swimmer discloses the method of claim 2, wherein the comparing the contents of the received program to at least one predetermined instruction patterns further comprises: searching predetermined locations of the received contents of the program for the predetermined instructions. **(para. 27, 55, 58, the memory location containing a possible infected dameon is scanned)**

10. Regarding claim 7, Swimmer discloses a system comprising: a virtual machine to receive contents of a program for creating a virtual environment for interacting with a host platform in a computing device **(para. 17, 22, 44-45; With the intrusion detection system performing the function of a virtual machine, a daemon is analogous to a program creating a virtual environment and the operating system being analogous to the host platform)**, the virtual machine comprising a detector subsystem to determine if the received contents comprises predetermined instructions for performing at least one unauthorized task. **(para. 22-23- malicious code strings being analogous to predetermined instructions for performing unauthorized tasks)**

Art Unit: 2433

11. Regarding claim 8, Swimmer discloses the system of claim 7, wherein the detector subsystem is to purge the predetermined instructions from the received contents of the program, wherein the detector subsystem further comprises :a comparator logic to compare the received contents of the program to at least one predetermined instruction patterns corresponding to the predetermined instructions for performing the at least one unauthorized task **(para. 22, a pattern filter is used to identify malicious code strings)**; and a search logic to search predetermined locations of the received contents of the program for the predetermined instructions.

(para. 15, 17- the malicious code string is extracted from the daemon code)

12. Regarding claim 11, Swimmer discloses the method of claim 8, wherein the at least one predetermined instruction patterns are stored in a database in communication with the virtual machine. **(Fig. 2, element 21, para. 60-61)**

13. Regarding claims 12-14, they merely recite a computer program that when executed, performs the functional steps of method claims 1-3, and thus, rejected for the same rationale.

14. Regarding claim 15, Swimmer discloses a method comprising: receiving a system call for a host platform in communication with a virtual machine of a computing device **(para. 17- system calls are monitored)**; and determining by the virtual machine if the received system call comprises at least one predetermined system call for performing at least one unauthorized task. **(para. 17- system call patterns examined for non-normal behavior)**

Art Unit: 2433

15. Regarding claim 16, Swimmer discloses the method of claim 15, wherein the determining if the received system call comprises predetermined system call further comprises: comparing the system call to at least one predetermined system call patterns corresponding to the predetermined system calls for performing the at least one unauthorized task. **(para. 17)**

16. Regarding claim 17, Swimmer discloses the method of claim 16, wherein the unauthorized task comprises: a task predetermined to be an inhibitive task by the computing device; and a task to output data into memory regions storing at least one of instructions and data for operations of the virtual machine. **(para. 52- eg. The malicious code string being instructions to jump to code which 'spawns a shell' program)**

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swimmer as applied to claim 2 above, and further in view of Altman et al. (US Pub. 20040044880 A1).

19. Regarding claim 4, Swimmer discloses the method of claim 2, but is silent on the program to be examined for unauthorized instructions residing in a translation cache

Art Unit: 2433

and checking branch targets as recited in claim 4. However, Altman discloses a virtual machine manager which translates a portion of the virtual machine code and stored in a translation cache. **(para. 28-31)** In addition, Altman discloses checking whether a branch within the translated code branches outside to untranslated code. **(Fig. 1, para. 33)** Therefore, taking the combined teachings of Swimmer and Altman as a whole, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a translation cache for storing and checking the program contents for unauthorized code since it allows for faster future use of the code.

20. Regarding claim 5, the combination of Swimmer and Altman discloses the method of claim 4, further comprising: generating checking and determining instructions for performing the checking the branch target and determining if the checked branch target comprises at least one of a translation cache and the execution engine. **(Altman- para. 28- 31, interpretation and compilation instructions)**

21. Regarding claim 6, the combination of Swimmer and Altman discloses the method of claim 2, wherein the virtual machine comprises an execution engine and at least one interpret function invoked by the execution engine, wherein the contents of the program reside in the at least one interpret function. **(Altman- para. 28-32, 38)**

22. Regarding claims 9-10, they are rejected as applied to claims 4-6 because a corresponding system would have been necessitated to carry forth the method steps of claims 4-6. The applied prior art also discloses the corresponding architecture.

Art Unit: 2433

23. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swimmer further in view of Draves (US 5,873,124).

24. Regarding claim 18, Swimmer discloses a method comprising: receiving a virtualized memory address for a host platform in communication with a virtual machine of a computing device; and determining by the virtual machine if the received virtualized memory address comprises at least one predetermined unauthorized virtualized memory address. **(para. 17, 45)**. However, Swimmer is silent on explicitly utilizing virtualized memory address. However, virtualized memory addresses are notoriously well known and used in the art as evidenced by Draves **(see abstract)**. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize it in the teachings of Swimmer to allow program code to be compiled as though each process will enjoy exclusive access to the entire memory address space.

25. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swimmer and Draves as applied to claim 18 above, and further in view of Altman et al. (US Pub. 20040044880 A1).

26. Regarding claim 19, the combination of Swimmer and Draves discloses the method of claim 18, but is silent on the virtual machine further comprising at least one of a translation cache to store translation data; an execution engine; and at least one interpret function invoked by the execution engine. However, Altman discloses a virtual machine manager which translates a portion of the virtual machine code and stored in a translation cache. **(para. 28-31)**. In addition, Altman discloses an execution engine and at least one interpret function invoked by the execution engine **(para. 28-32, 38)**

Art Unit: 2433

Therefore, taking the combined teachings of Swimmer, Draves and Altman as a whole, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a translation cache for storing and checking the program contents for unauthorized code since it allows for faster future use of the code.

27. Regarding claim 20, the combination of Swimmer, Draves and Altman discloses the method of claim 19, wherein the determining by the virtual machine if the received virtualized memory address comprises at least one predetermined unauthorized virtualized memory address comprises: determining if the virtualized memory address is in a memory space available to the translation cache (**Altman- para. 28-32**); determining if the virtualized memory address is in a memory space available to the at least one interpret function (**Altman- para. 28-32**); and determining if the virtualized memory address is in a memory space region storing at least one of instructions and data for operations of the virtual machine. (**Altman- para. 28-32**)

Conclusion

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Worley, Jr. (US Pub. 20070106986 A1) for a secure virtual machine monitor utilizing a translation cache. Schmid et al. (US Pub. 20050223238 A1) for identifying malicious code features in an executable file. Koryakin et al. (US 7,555,592 B1) and Dobrovolskiy et al. (US 7,647,589 B1) for identifying and preventing unsafe instructions within a virtual machine environment. Williamson et al. (US Pub. 20090049552 A1) for removing malicious code from computers. Song et al. (US Pub.

Art Unit: 2433

20060143707 A1) for detecting and removing malicious codes including looking at system calls. Van der Made (US Pub. 20080320595 A1) for identifying malicious code in a virtualized environment.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM CORUM whose telephone number is (571) 270-5195. The examiner can normally be reached on Monday through Friday 7:30 a.m. - 5:00 p.m., every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Krista Bui can be reached on 571-272-7291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KIEU-OANH BUI/
Supervisory Patent Examiner, TC 2400

WILLIAM CORUM
Examiner, Art Unit 2433